Mechanical Fastening: A Manufacturer’s Response

A blanket recommendation for mechanical fasteners doesn’t take the diversity of the exterior insulation systems into account.

Few construction industry issues have sparked as much discussion as the application of Exterior Insulation and Finish System (EIFS) to gypsum sheathing product.

Quite simply, the debate centers around the adhesion capability of EIFS to gypsum sheathing over conventional stud wall construction methods. In the past, under certain isolated conditions, the bond between the wall system’s insulation board and gypsum sheathing had been compromised, as a result of water infiltration behind the system. Although the board is a sheathing material, it cannot withstand long term, repeated soakings and will disintegrate with time.

As a result, the U.S. Gypsum Association and a number of large gypsum product manufacturers have advocated mechanical fasteners be applied through the sheathing and into the wall framing. Furthermore, some companies have alleged that standard EIFS adhesive applications to gypsum sheathing will cause system failure.

Other gypsum companies have taken the unprecedented step of asking their sales/technical personnel to recommend to their customers that mechanical fasteners be a mandatory component in future EIFS construction.

In our judgement, the reaction of the U.S. Gypsum Association and member companies is an unrealistic and unwarranted response to an issue that requires clarification, not confrontation.

This article will provide a brief history of the symbiotic relationship between EIFS and gypsum sheathing, detail our objections to the mechanical fastening proposal, and offer a more reasonable approach to assuring EIFS performance standards.

History of EIFS . . .

EIFS has a 16 year track record in the American construction industry. More than 80,000 projects, representing over 300,000,000 sq. ft. of wall area have been completed over this period.

The first EIFS application to gypsum sheathing took place in 1970. Since then, at least 80% of all wall system projects were installed on gypsum sheathing. Significantly, more than 85% of those projects were adhered without any mechanical fastening.

That translated to over 250,000,000 sq. ft. of EIFS adhered to gypsum sheathing which has endured virtually every possible climatic extreme. Reasonable explanations can be offered for each of the relatively few attachment failures that have occurred within this time, and in the rare instance of true adhesion failure, EIFS manufacturers have responded promptly.

There have also been mechanically fastened applications over gypsum sheathing, as well as other substrates throughout the history of EIFS. Traditionally, these types of systems have 

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performed extremely well. They are, for the most part, thicker, polymer-modified plaster systems which adjust well to mechanical fastening.

The analogy between the adhered and mechanically fastened systems is similar to the welded vs. bolted steel connections or wire tied vs. masonry bonded brick wall argument. Both are successful, but inherently different attachment techniques.

The Issues . . .

The Exterior Insulation Manufacturer’s Association (EIMA) has manufacturer members who require mechanical fasteners, members who disallow mechanical fastening and members who have options for either method. We feel that each individual manufacturer is in the best position to specify attachment methods and accept responsibility for their work.

A blanket recommendation for mechanical fasteners doesn’t take the diversity of the EIFS marketplace into consideration. As an EIFS manufacturer, we request only that our company be allowed to specify the manner in which our systems are attached to the substrate. Different systems will have varying attachment techniques for various substrates.

We are not suggesting that gypsum board manufacturers accept responsibility for the adhesive application of any material to gypsum board. It makes no sense to accept liability for a wall costing $5.00 per square foot when a gypsum manufacturer sells only 15 cents per square foot of material and has no control over the composition or installation of the wall.

However, recent sales bulletins issued by certain gypsum producers have stated that adhered systems either have already failed, or will fail in the future. Not only is this information wholly inaccurate, it also has the additional harmful result that recommendations in some of these bulletins will result in the voiding of the EIFS warranty, with no counterbalancing protection from the gypsum manufacturer.

The Facts . . .

Mechanical fasteners have been an integral component in American construction for many years. Why shouldn’t they be used for all EIFS applications? The answer is simple.

The process of affixing a mechanical fastener to exterior insulation board changes the physics of the entire wall structure. Mechanical fasteners are just not compatible with all exterior insulation systems.

EIFS systems are barrier as opposed to drainage systems. Proper detailing, application, and maintenance must be accomplished to keep water out.

Water is the curse of all wall systems. Drainage of wall systems might appear to be preferable (i.e. masonry cavity wall construction), but drainage can be as difficult to accomplish as barrier construction.

Good construction practices regarding EIFS should be followed as they should with any building material. Once again, we need to look at the track record of EIFS barrier walls. If the worst case scenario occurs and water gets in, what happens? A relatively small amount of gypsum
board is affected and the EIFS system loosens and bulges. The repair is localized and easy to complete. The problem does not result in instability or other structural failure and poses no threat to people or property.

When EIFS was first introduced in the United States, the major drawback was that only laboratory tests and theory were available. The facts are that these systems are proven to be effective water barriers, that they keep gypsum sheathing dry and in good condition, and that the problems are rare and acceptable in scope.

Finally, we occasionally hear of "dew point" problems creating delamination of gypsum sheathing due to condensation. In the first place, vapor barriers are recommended in 95% of the U.S. by ASHRAE. Secondly, it is necessary to perform engineering analyses of each wall configuration in order to be able to make any statement concerning condensation. Finally, the industry has not yet found any confirmed evidence of sheathing delamination which can be assigned to condensation behind an EIFS installation.

The Solution . . .

Calling for fasteners will not necessarily assure better EIFS performance. We recommend the following steps to insure the best performance of EIFS:

- Adherence to manufacturer’s specifications and testing;
- Written recommendations from the EIFS manufacturer for your project;
- A detail review by the EIFS manufacturer;
- Use of exterior grade gypsum sheathing which meets ASTM C-79 at the time of the EIFS installation.

In all situations, get recommendations from the EIFS manufacturer who best knows and understands the performance of his system.